Isao YOSHIMURA*: **Japanese species of *Anema*****

吉村 庸*: ジュズキノリ属地衣の邦産種**

In the course of my study of Japanese species in the Pyrenopsidaceae, I found three species of *Anema*, among which *A. asahinae* is a new species, *A. decipiens* is the first record from Japan, and *A. latissimum* is treated as a member of *Anema* instead of *Thyrea*. This genus is reported for the first time from Japan.

Anema Nyl., Flora 62: 353 (1879)

Omphalaria subg. *Anema* (Nyl.) Harm. & Claud., Guide Élement. Lichenol. 40 (1904).

Nylander (1879) separated *Anema* from *Omphalaria* (=*Thyrea*) on a basis of *Anema nummularium* (Dur. ex Mont.) Nyl. with its paraplectenchymatic tissue composed of moniliform hyphae, while the thallus of *Thyrea* is composed of thin, uniform hyphae. Forsell (1887) made a monographic work of Pyrenopsidaceae in which he recognized Nylander's treatment.

At present, about 10 species of *Anema* are known. Most species of *Anema* have small, foliose thalli. However, *A. jeniseijense* Magn. has a subfruticose thallus and *A. latissimum* has a big monophyllous thallus. Only *A. latissimum* and *A. asahinae* have heteromerous thalli like those of members of *Thyrea*, because the medulla is composed of a central hyphal layer, and algal layers are located near both upper and lower surfaces, while the other members are homomerous.

Species with heteromerous thalli are larger than the species with homomerous thalli in Pyronopsidaceae, and the heteromerous thalli seem to be mechanically stronger than the homomerous ones. The character of the thalli being homomerous or heteromerous in the Pyrenopsidaceae does not have consistent taxonomic value because in *Phylliscum P. japonicum* is hetero-

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merous, and *P. microphyllum* is homomerous, and *P. demangeonii* varies from homomerous to heteromerous in its structure.

All members have 8 spores in an ascus except for *A. decipiens* which produces 16 spores. *A. latissimum* and *A. asahinae* are known from riverside rocks including non-calcareous ones, and *A. dodgei* grows on soil along rivers while the other species usually grows on calcareous rocks. Three species of *Anema* are known from Japan. Satisfactory amounts of lichen substances

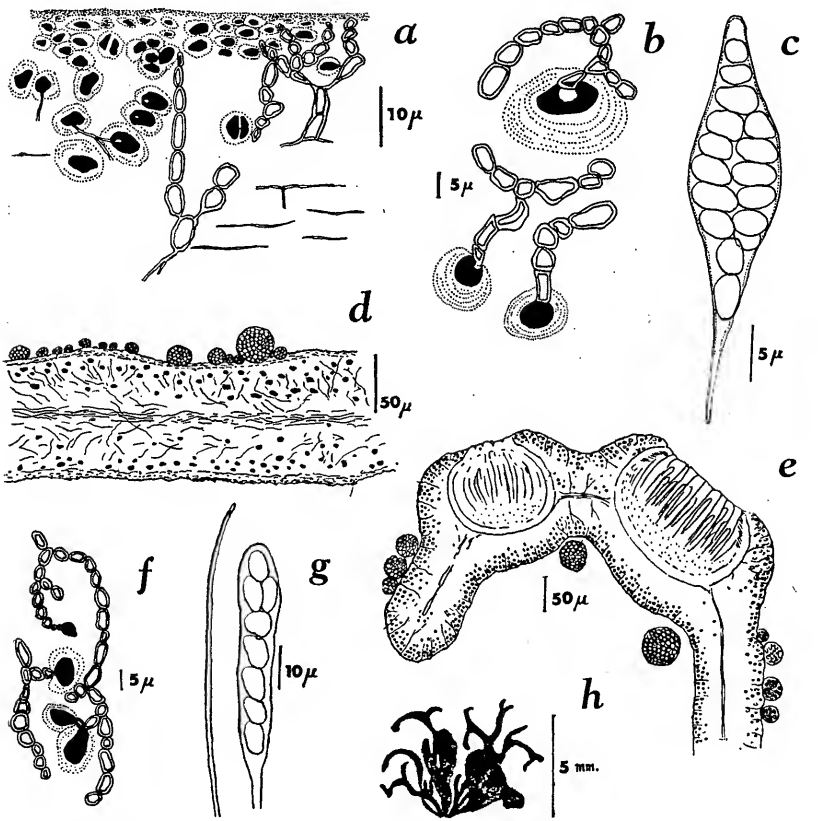

Fig. 1. a: *Anema latissimum* (Asah.) Yoshim.; diagram of cross-section of the thallus, showing moniliform hyphae. b-c: *Anema decipiens* (Mass.) Forss. b: Moniliform hyphae with *Gloeocapsa*. c: 16 spores in an ascus. d-h: *Anema asahinae* Yoshim. d: Diagram of cross-section of the thallus. e: Diagram of cross-section of the thallus with apothecia. f: Moniliform hyphae with *Gloeocapsa*. g: Paraphysis and an ascus with 8 spores. h: Plant whowing natural shape. a-d, f. original; e, g, h. after Asahina.

(acetone extracts) are not obtained from the thallus of any species of Japanese *Anema*.

Key to Japanese Species

1. Thallus small, less than 5 mm wide, homomerous; 16 spores in an ascus; growing on limestone ..... *A. decipiens*
1. Thallus more than 5 mm wide, heteromerous; 8 spores in an ascus; growing on rocky riverbank.
   2. Thallus up to 5 cm wide, monophyllous, pruinose; isidia mostly on lower surface..... *A. latissimum*
   2. Thallus less than 3 cm wide, polyphyllous, irregularly laciniate, epruinose; isidia mostly on upper surface ..... *A. asahinae*

Anema decipiens (Mass.) Forss., Nov. Act. Reg. Soc. Sci. Upsal. ser. 3, **8**: 92 (1885). (Fig. 1, b-c)

Omphalaria decipiens Mass., Symmict. Lich. 61 (1855)—*Thyrea decipiens* Mass., Flora **39**: 211 (1856)—*Collema decipiens* Nyl., Mem. Soc. Sci. Nat. Cherbourg **5**: 89 (1857).

Thallus 5 mm wide, olive-green, composed of increased bulbous and crowded lobes, paraplectenchymatic, homomerous, hyphae moniliform, 3-4 μ wide, symbiotic alga *Gloeocapsa* (sect. *Xanthocapsa*), sheath K −, apothecia almost immersed in the thallus, asci obclavate or cylindrical with 16 spores, spores ellipsoid, 3-4 μ, paraphyses simple.

Type specimen. From Europe (not seen).

Specimens examined. NORWAY. Kristiana, *N. G. Moe* (US). GERMANY. Baiern, *Krempelhuber* (TNS). Tirol, Kalkfelsen am Achensee, *Lösch* (TNS). CZECHOSLOVAKIA. Zilina, 1922, *J. Suza* (US). JAPAN. Hondo: Prov. Awa, Nokogiri-yama, March 31, 1932, *F. Fujikawa 32331* (TNS). Bonnin Islands, Hahajima, Aug. 19, 1930, *Fujikawa 30819* (TNS).

Range. Europe, Japan.

Habitat. On calcareous rocks.

This is the only species with 16 spores in an ascus in the genus *Anema*. It more or less resembles *Phylliscum microphyllum*, from which it is easily distinguished by the following diagnostic characters: the olive-green color of thallus instead of reddish brown in moist condition, moniliform hyphae, rather

than thin uniform hyphae, and gonidial cells *Gloeocapsa* (sect. *Xanthocapsa*). This is the first record in Asia. Asian specimens are more lobed and aggregated than European specimens. The above description is based on Japanese specimens.

Anema asahinae Yoshim., sp. nov. (Fig. 1, d-h)

Thallus olivaceus vel atro-virens, foliosus, laciniatus, laciniis aggregatis, irregularibus, spathulatis vel linearibus, saepe irregulariter ramosis, ca. 1-5 mm latis, in superne mox isidiosis, isidiis globosis, 135 μ, hyphis moniliformibus, 1.5-2 μ latis. Apothecia ad 0.2 mm lata, cum margine thalloideo; hymenium ca. 100 μ, I + coerulescens; paraphyses simplices; asci cylindrici; sporae 8-nae, simplices, ecoloratae, ellipsoideae, 8-9×5-6 μ. Pycnidia non visa. Alga ad *Gloeocapsa* (sect. *Xanthocapsa*) pertinens.

Type specimen. JAPAN. Hondo: Prov. Suruga, above Ayutsubo along the Kisegawa, April 1931, *Y. Asahina 3140* (holotype, TNS).

Additional specimens examined. JAPAN. Shikoku: Prov. Sanuki, Yashima, 1932, *F. Fujikawa 32910* (TNS). Prov. Awa, Yashiki-machi, Naka-gun, 1961, *T. Inobe 3* (TNS); Yokose, Katsuura-gun, 1961, *Inobe 4* (TNS); Kamiyama-cho, Myozai-gun, 1962, *Inobe 41* (TNS). Prov. Tosa, Ogawa, Kami-gun, 1960, *Yoshimura 2566* (NICH); Kuwao, Tosayama near Kochi, 1956, *Yoshimura 619* (NICH). MANCHURIA. Liaotun, Kinhsien, Sept. 1928, *Asahina 54* (TNS).

Range. Japan, South Manchuria.

Habitat. On riverside rocks, including non-calcareous rocks.

This species was first collected by Y. Asahina on riverside rocks along the Kisegawa. Under *Thyrea* sp., he (1931) published a short description in Japanese, showing some illustrations. This species is foliose in shape, and its thallus is heteromerous like that of *Thyrea hondoana* and *T. pulvinata*. However, the hyphae are moniliform, and they form a paraplectenchymatic hyphal tissue; therefore, this species can be best classified under the genus *Anema* rather than *Thyrea*. The disc of the apothecia is more or less open, and its color is reddish brown like that of *Anema nummularium*. The name of *Anema asahinae* is proposed to this new species in honor of Dr. Y. Asahina who first collected and studied this species.

Anema latissimum (Asah.) Yoshim., comb. nov. (Fig. 2, a)

Thyrea latissimum Asah., Journ. Jap. Bot. **33**: 67 (1958).

Type specimen. JAPAN. Shikoku: Prov. Awa, Sawadani-mura, Naka-gun, Nov. 23, 1957, *M. Togashi 57112* (holotype, TNS).

Range. Endemic to Japan (known only from type locality).

The hyphae of this species are moniliform (fig. 2, e), and this species is considered to be a member of *Anema*. Its morphological features and color of the thallus are similar to those of *A. asahinae*. However, the thallus is monophyllous, pruinose, and much larger than that of *A. asahinae*. The thallus of *A. asahinae* is laciniately lobed, aggregated, and epruinose. *Anema latissimum* has granulate isidia on the under surface of the thallus, while in *A. asahinae*, the isidia are located mostly on the upper-surface of the thallus.

Literature Cited

Asahina, Y. 1931. *Thyrea hondoana* and *Thyrea* sp. Jour. Jap. Bot. 7: 275–277. Forsell, K. B. J. 1887. Beiträge zur Kenntniss der Anatomie und Systematik der Gloeolichenen. Nov. Act. Reg. Soc. Sci. Upsal., ser. 13, 8: 1–118. Nylander, W. 1879. Addenda nova ad Lichenographiam europeam. Flora 62: 353–360.

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ジュズキノリ属 (新称) はジュズ状に連らなる菌糸を持つので細糸状の菌糸からなるミタキノリ属 (*Thyrea*) とは区別される。アジアから確実な報告はなかったが本文で日本産として 3 種を記録した。新種の *Anema asahinae* は朝比奈先生が最初に黄瀬川で採集されキセガワノリと呼ばれたものである。四国から報告された *Thyrea latissima* はジュズ状の菌糸を持つのでジュズキノリ属に編入した。この外に欧州と共通な *Anema decipiens* が房州の鋸山と小笠原の母島から知られた。

○地衣類思い出話 (4) (富樫 誠) Makoto Togashi: Miscellaneous notes on lichens or lichenological survey (4)

昭和 32 年 (1957) の秋，越後東蒲原郡津川町の名所キリン山で朝比奈先生と採集を楽んだが，其折すぐ側を流れる阿賀野川原の岩盤 (流紋岩) を物色して居たら，立派な葉体の発達した固着地衣の大群落を見付けたので，早速大量の岩片を採集した。これは後に先生が *Lecanora alphoplaca* Ach. と同定されたもので，先生のハーバリウム中を捜索したら，邦産標本としては昭和 2 年 (1927) に浅間山，小峯小屋下で山本 (高宮) 篤氏が採集した貧弱な標本と，1928 年に先生自身の南満本溪湖採集品と，1943 (昭和 18 年) に武田研究所の派遣した蒙疆採集隊員渡辺 武，藤川福二郎両氏のよき標本があった。兎に角上記阿賀野川原の群落は地衣自身の発育の立派で豊富な点は特筆に値するものと思う。